

GNOMON: ENABLING DYNAMIC ONE-SWITCH GAMES FOR CHILDREN WITH SEVERE MOTOR DISABILITIES

- To propose **GNomon**, a framework for creating dynamic one-switch video games for children with severe motor disabilities..
- To present **two GNomon-based games** designed in collaboration with a group of healthcare experts.

1 OBJECTIVE

Children with severe motor disabilities usually rely on the use of one-switch interfaces for accessing electronic devices and often these are not enough for supporting access to challenging and **dynamic video games**.

2 MOTIVATION

It allows to select one of many elements from the screen without extra special hardware.

3 FEATURES

The selectable elements do not need to be arranged in any particular configuration or to be stationary.

State-of-the-art Unity integration with functionalities for creating resizable sets of selectable game objects with the associated clocks.

Enables dynamic point-and-click game mechanics using a single switch.

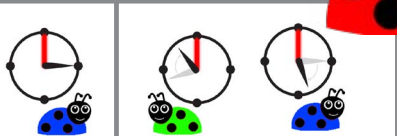
Designed in close collaboration with a team of speech therapists, physiotherapists and psychologists from one of the Local Health Agencies in Turin, Italy.

Eye catching clock design with additional indicators for facilitating the interaction.

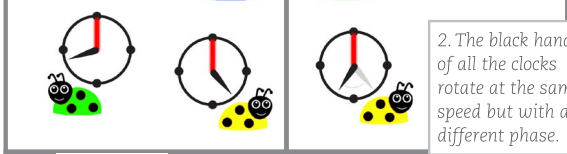
Customizable clock speed rotation and auditory and visual feedbacks.

How it works?

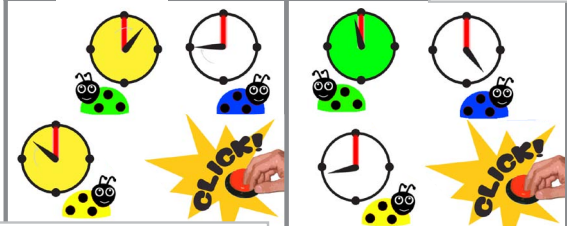
1. A clock is associated to every selectable element. Each clock has a moving black hand and a red hand fixed at noon.



2. The black hands of all the clocks rotate at the same speed but with a different phase.



3. When the switch is pressed, **GNOMON** calculates for every clock the probability of being selected, given the clicks thus far. Clocks with high probability become yellow and the process start again.

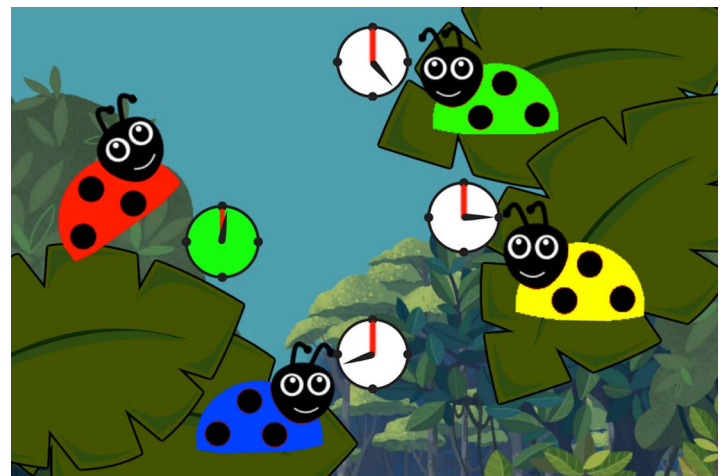


4. Finally, when the probability of a clock reaches a threshold, the clock becomes green and its associated element gets selected.

4 THE GAMES

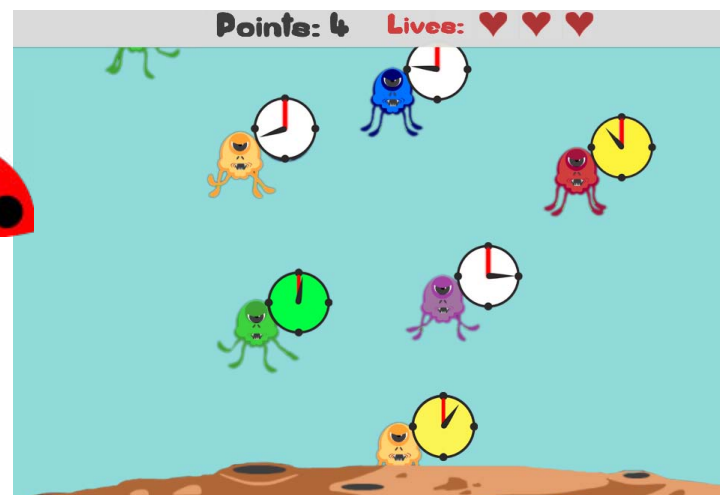
One Switch Ladybugs

A simple **action/reaction** video game to make one of four ladybugs jump. There are no scores or time constraints of any kind because it has been designed mainly for explaining to the children how the clock-based selection works.



One Switch Invaders

A **dynamic one-switch game** that does not require accurate timing or clicking precision. The game objective is to score points by killing the falling down aliens before three of them touch ground.



Future works will consist on evaluating the **usability, accessibility and playability** of video games based on GNomon with a group of ten children with severe motor disabilities.

5 FROM NOW ON



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